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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,454	07/07/2003	Brent J. Bos	DON08 P-1104	7521
28101	7590	05/06/2004	EXAMINER	
VAN DYKE, GARDNER, LINN AND BURKHART, LLP 2851 CHARLEVOIX DRIVE, S.E. P.O. BOX 888695 GRAND RAPIDS, MI 49588-8695			AMARI, ALESSANDRO V	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 05/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/614,454	BOS, BRENT J.	
	Examiner	Art Unit	
	Alessandro V. Amari	2872	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 87-138 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 87-92, 100-116, 121-129 and 134-138 is/are rejected.
- 7) ☒ Claim(s) 93-99, 117-120 and 130-133 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>7/7/2003</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 87, 90, 101-112, 121-128, 134 and 135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakabayashi et al US Patent 6,018,425 in view of Schofield et al US Patent 5,796,094.

In regard to claims 87, 105 and 121, Nakabayashi et al teaches (see for example, Figures 1, 3) a vehicular vision system comprising a wide angle lens group positionable on a portion of a vehicle for refracting a virtual image of an exterior view from the vehicle, thereby creating a wide angle refracted image, said wide angle lens group including an outer negative optic (5 (6, 7)) and an inner negative optic (4), a focusing lens group (1, 8) which receives said refracted image and focuses the refracted image onto an image plane; an image capture device positioned on said image plane to receive the focused image from said focusing lens group, said wide angle lens group and said focusing lens group defining an optic path between an outer end of said wide angle lens group and said image capture device as shown in Figures 1 and 3 and as described in column 1, lines 11-13, 30-67 and column 2, lines 1-13, 41-67.

Regarding claim 90, Nakabayashi et al teaches that the image distortion correction process is at least partially provided by a plurality of refractive optics as

shown in Figures 4-9 and as described in column 4, lines 67-68 and column 5, lines 1-16.

Regarding claim 127, Nakabayashi et al teaches (see for example Figures 1, 3) that said at least one lens comprises a wide angle lens group including an outer negative optic (5 (6,7)) and an inner negative optic (4).

Regarding claim 134, Nakabayashi et al teaches (see for example Figures 1, 3) that said at least one lens includes at least one wide angle lens (4, 5 (6, 7)) and at least one focusing lens (1, 8), said at least one focusing lens being disposed between said at least one wide angle lens and said imaging array as shown in Figures 1 and 3.

However, in regard to claims 87, 89, 104, 110, 111, 112, 126, 128 and 135, Nakabayashi et al does not teach that the lenses comprising at least one of a polycarbonate and acrylic material or crown glass. It would have been obvious to one having ordinary skill in the art at the time the invention was made to manufacture the optics using the materials claimed, since it has been held to be within the ordinary skill of the worker in the art to select a known material on the basis of its suitability for the intended use. One would have been motivated to manufacture the optics using crown glass or plastic for the purpose of making a clear, shatter resistant lens. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945)

Furthermore, in regard to claims 87, 101, 102, 103, 105, 106, 107, 108, 109, 121, 122, 123, 124 and 125, Nakabayashi et al does not teach an image distortion correction process whereby an image captured by said vision system is processed to correct distortion therein; or an image capture device having a non-uniform array of pixels and a

display which displays a substantially non-distorted image of the scenic information, the non-distorted image being communicated from said image distortion process or wherein said non-uniform array of pixels has a coarse distribution of pixels in at least one portion of said non-uniform array corresponding to at least one portion of the image where there is minimal distortion or wherein said non-uniform array of pixels has a fine distribution of pixels in at least one portion of said non-uniform array corresponding to at least one portion of the image where there is greater distortion or wherein said non-uniform array of pixels has a coarse distribution of pixels in at least one portion of said non-uniform array or wherein the image capture device comprises a CMOS imaging array.

In regard to claims 87, 101, 102, 103, 105, 106, 107, 108, 109, 121, 122, 123, 124 and 125, Schofield et al does teach (see Figure 11b) an image distortion correction process whereby an image captured by said vision system is processed to correct distortion therein as described in column 9, lines 58-67 and column 10, lines 1-17; or an image capture device having a non-uniform array of pixels (42') and a display which displays a substantially non-distorted image of the scenic information, the non-distorted image being communicated from said image distortion process or wherein said non-uniform array of pixels has a coarse distribution of pixels in at least one portion of said non-uniform array corresponding to at least one portion of the image where there is minimal distortion or wherein said non-uniform array of pixels has a fine distribution of pixels in at least one portion of said non-uniform array corresponding to at least one portion of the image where there is greater distortion or wherein said non-uniform array of pixels has a coarse distribution of pixels in at least one portion of said non-uniform

array therein as described in column 9, lines 58-67 and column 10, lines 1-17 or wherein the image capture device comprises a CMOS imaging array as described in column 8, lines 38-45.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to the image capture device of Schofield et al in the vision system of Nakabayashi et al in order to improve the spatial differentiation characteristics of the vision system as described in column 2, lines 52-58.

3. Claims 88, 91, 113, 114, 136 and 137 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakabayashi et al US Patent 6,018,425 in view of Schofield et al US Patent 5,796,094 and further in view of Foo US Patent 5,880,879.

Regarding claims 88, 91, 113, 114, 136 and 137 Nakabayashi et al in view of Schofield et al teaches the invention as set forth above but does not teach in regard to claims 88, 113, 136 that said focusing lens group includes a refractive and diffractive lens element positioned along said optic path or in regard to claims 91, 114, 137 that said focusing lens group includes at least one diffractive element positioned along said optic path, said diffractive element correcting color focusing of the refracted image.

Regarding claims 88, 91, 113, 114, 136 and 137 Foo does teach (see Figure 1) in regard to claims 88, 113, 136 that said focusing lens group includes a refractive and diffractive lens element (106, 108) positioned along said optic path as described in column 4, lines 26-39 and column 5, lines 18-58 and in regard to claims 91, 114, 137 that said focusing lens group includes at least one diffractive element (106) positioned

along said optic path, said diffractive element correcting color focusing of the refracted image as described in column 4, lines 26-39 and column 5, lines 18-58.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the diffractive elements as taught by Foo in optical system of Nakabayashi et al in view of Schofield et al in order to correct for chromatic and spherical aberrations.

4. Claims 92, 116 and 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakabayashi et al US Patent 6,018,425 in view of Schofield et al US Patent 5,796,094 and further in view of Chen US Patent 5,044,706.

Regarding claims 92, 116 and 129, Nakabayashi et al in view of Schofield et al teaches the invention as set forth above but does not teach in regard to claims 92, 116 and 129 that said wide angle lens group includes at least one wide angle diffractive element positioned along said optic path, said wide angle diffractive element correcting color focusing of the refracted virtual image.

Regarding claims 92, 116 and 129, Chen does teach (see Figure 5) that said wide angle lens group includes at least one wide angle diffractive element (106, 108) positioned along said optic path, said wide angle diffractive element correcting color focusing of the refracted virtual image as described in column 5, lines 42-44 and column 6, lines 19-28.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the diffractive elements as taught by Chen in optical

system of Nakabayashi et al in view of Schofield et al in order to correct for chromatic and spherical aberrations.

5. Claims 100, 115 and 138 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakabayashi et al US Patent 6,018,425 in view of Schofield et al US Patent 5,796,094 further in view of Foo US Patent 5,880,879 and further in view of Chen US Patent 5,044,706.

Regarding claims 100, 115 and 138, Nakabayashi et al in view of Schofield et al and further in view of Foo teaches the invention as set forth above but does not teach that said wide angle lens group includes at least one wide angle diffractive element positioned along said optic path, said wide angle diffractive element correcting color focusing on the refracted image.

Regarding claims 100, 115 and 138, Chen teaches (see Figure 5) that said wide angle lens group includes at least one wide angle diffractive element (106, 108) positioned along said optic path, said wide angle diffractive element correcting color focusing on the refracted image as described in column 5, lines 42-44 and column 6, lines 19-28.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the diffractive elements as taught by Chen in optical system of Nakabayashi et al in view of Schofield et al and further in view of Foo in order to further correct for chromatic and spherical aberrations.



***Allowable Subject Matter***

6. Claims 93-99, 117-120 and 130-133 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 93, 117 and 130 are allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "said wide angle diffractive element being defined by the equation:  $\varphi = A_1\rho^2 + A_2\rho^4$  where  $\rho$  is a radial aperture coordinate divided by 1 mm,  $A_1$  is a constant within a range of approximately 15 to 55 and  $A_2$  is a constant within a range of approximately  $-0.01$  to  $-0.5$ " as set forth in the claimed combination. Claims 94-99, 118-120 and 131-133 are also allowable based upon their dependence on claims 93, 117 and 130, respectively.

The prior art of record, Nakabayashi et al, Schofield et al, Foo and Chen teach a vehicular vision system comprising a wide angle lens group including at least one wide angle diffractive element, a focusing lens group and image capture device, a image distortion correction process or pixilated imaging array with a non-uniform array of pixels and a display but does not teach that the wide angle diffractive element is defined by the claimed equation and there is no teaching or motivation to modify this difference as derived.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Macy et al US Patent 6,538,691 and Yamaguchi et al US Patent 5,818,527 teach image distortion correction processes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava JV1  
30 April 2004

  
MARK A. ROBINSON  
PRIMARY EXAMINER